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Educating the Public about the Health and Welfare Risks Associated with Ground-Level Ozone

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This report is part of the National Network for Environmental Management Studies under the auspices of the Office of Cooperative Environmental Management of the U.S. Environmental Protection Agency. This NNEMS research project recommends ways to increase media coverage of the poisonous ozone problem. Current media fails to discriminate between "good" ozone (stratospheric) and poisonous ozone (tropospheric) creating public confusion. Initial recommendation encourages the Agency to add an "adjective" to the word ozone to communicate a clear, powerful message vividly depicting the harmful distinction.

EPA's poisonous ozone communications campaign hinges largely on it ability to capitalize on "free" media resources and educational institutions. A media kit developed for press members will facilitate television, radio and newspaper coverage of the summer ozone problem. The kits can be distributed at an EPA news conference directed at the poisonous ozone problem.

Simultaneously, educational kits for students should be created and distributed to institutions throughout the nation. Creativity and EPA commitment are keys to this Ozone awareness campaign. Current practices similar to poster contests and Earth Day activities can be utilized as models to generate student interest.

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EDUCATING THE PUBLIC ABOUT THE HEALTH AND WELFARE RISKS ASSOCIATED WITH GROUND-LEVEL OZONE

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EXECUTIVE SUMMARY

The U.S. Environmental Protection Agency (EPA) and states are faced with the challenge of how to effectively educate the public about the health and welfare risks associated with ground-level ozone concentrations above the National Ambient Air Quality Standard (NAAQS). Through the National Network for Environmental Management Studies (NNEMS), EPA Region 1 sponsored a graduate student project to research this topic (Project #1301). This report contains the findings of the research project and is based on extensive literature searches and comprehensive interviews with over 50 experts on the following topics:

- health and welfare effects of ozone;
- risk communication; and
- public relations/public education.[1]

Methods of Research

Research on the health and welfare effects consisted of reviewing numerous articles and studies. This research included references to Dr. Morton Lippmann's "Health Effects on Ozone: A Critical Review" as well as studies conducted by Professor John Skelly of Penn State University, other scientists, and park officials on the effects of ozone exposure on eastern hardwood tree species.

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[1] Appendix B lists names, addresses, and phone numbers of contacts.

Research was also conducted in the field of risk communication--the communication of dangers or hazards of an environmental problem. To date, there is little, if any, literature written on communicating the risks of ozone. Therefore, other closely related health threats such as radon, cigarette smoking, and the "killer smog" episode in Donora, Pennsylvania were reviewed. Of these, the EPA risk communications study on radon, "An Evaluation of Radon Risk Communication Approaches," proved to be the most useful reference (U.S. EPA, 1988).

The purpose of the radon study was to analyze the impact different communication materials had in raising radon awareness in selected communities. The communication materials tested were: the news media (television, radio, and newspapers), unsolicited mailings, posters/flyers, and community presentations and events. The news media was the most effective in raising people's awareness of radon; however, the use of **additional** communication materials was strongly recommended.

The third area--public affairs and public education--entailed numerous interviews with scientists, interpreters, professors, environmental reporters (including Dianne Dumanoski from The Boston Globe), public education coordinators (including Lillie Cox from Kentucky's Department of Environmental Protection), program coordinators (including Katie Mazer and Heather Gleason from the American Lung Association), among many others. Sections

3 and 4 assimilate ideas gleaned from conversations with these experts.

Findings

This study recommends ways to increase media coverage of the poisonous ozone problem. It also suggests ways to develop educational programs for children and adults through primary and secondary school programs and through community/civic organizations. (Appendix D lists communications "tools" available).

In order to increase the public's awareness of ozone, it is important that the Agency communicates a clear, powerful message. A distinction needs to be made between tropospheric ozone (which exists in the lower layer of the atmosphere) and stratospheric ozone (which exists in the upper layer of the atmosphere). To clarify the difference between two environmental factors (the "bad" from the "good" ozone), I recommend adding an adjective to the word ozone which vividly depicts its harmful effects, such as: "poisonous ozone."

The success of the EPA's poisonous ozone communications campaign will hinge largely on its ability to capitalize on media opportunities and on resources of educational institutions. The EPA can do this by carrying out two recommendations discussed in the conclusion (Section 6).

The first recommendation involves the press. The EPA can have an immediate impact on the public by taking advantage of media

opportunities. In order to use the media, the EPA could develop a media kit for press members that would facilitate television, radio, and newspaper coverage of the summer ozone problem. Additionally, the EPA could hold press conference(s) to distribute the kits. This conference would provide the EPA with an inexpensive means of educating the public--through the press--about ozone.

The second recommendation calls for the EPA to create an academic curriculum on poisonous ozone. The curriculum could be communicated to teachers through an educational kit. Each kit would provide teachers with creative lesson plans. By educating the younger generation, the EPA can have a long-term, positive impact on society. Students form opinions in their formative years of development that they can retain for a lifetime (Scheiner et al, 1981). They, in turn, can educate their parents about poisonous ozone.

INTRODUCTION

The purpose of this report is to determine the best methods for educating the public about the health and welfare effects of ground-level ozone.[2] The report is divided into seven sections. Section 1 identifies and summarizes the message that the EPA must communicate to the public about ozone. Section 2 suggests ways the EPA can increase media coverage through television, radio, and print. Educational programs for children and adults are reviewed in Section 3. Section 4 addresses the role of civic associations and environmental organizations. Section 5 discusses ways Region 1 can take advantage of a unique educational and media event, "Earth Day," beginning Sunday, April 22, 1990. Finally, Section 6 concludes with recommendations for implementing an ozone communications strategy. Appendices and a complete bibliography follow (Section 7).

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[2] Ground-level ozone is formed when sunlight and high temperatures cause hydrocarbons and oxides of nitrogen to react and form a molecule made up of three oxygen atoms.

SECTION 1: THE MESSAGE:

In the EPA Region 1 Office report, "Unfinished Business in New England," various environmental problems were ranked according to the human health and ecological risks they posed. Out of twenty-four environmental problems, ozone smog ranked the highest for both types of risk. It affects sixty percent of the American population (American Lung Association, 1989). Despite these statistics, the general public fails to recognize, and therefore underestimates, the risks associated with ozone. Ironically, other environmental problems, which pose less risk than ozone such as Superfund sites, have received greater public attention.

Part of the indifference towards ozone stems from the following public misconceptions:

- **Misconception: All ozone is good. We need it to protect the world from the sun.**
  The public confuses the "good" (stratospheric) ozone with "bad" (tropospheric) ozone.

- **Misconception: Why worry about ozone when its only a problem during the summer?**
  Ozone poses a health threat during the summer and generally does not arouse public attention during the other seasons.

- **Misconception: Ozone doesn't affect people who live in the country where the air is fresh.**
  Rural and suburban areas--not normally associated with pollution--are just as susceptible to high ozone levels as metropolitan areas. Winds carry the pollutant from one area to another. Indeed, remote areas like Acadia National Park in Maine and the summit of Mt. Washington in New Hampshire have recorded high ozone levels.

- **Misconception: Smog is only a problem in California.**
  While the ozone problem in southern California is bad, other areas of the United States are affected. In

> Massachusetts during the summer of 1988, the National Ambient Air Quality Standard (NAAQS) of 0.12 parts per million (ppm) was exceeded in 39 out of 90 days.[3]

In order to dispel public misconceptions and replace fiction with fact, the EPA has to communicate certain basic facts about ozone to the public:

- WHAT is ozone?
- WHERE does it come from?
- WHEN does it occur?
- WHO is responsible for it?
- WHY must we control ozone?
- HOW can we lower ambient ozone levels? (See steps people can take, Appendix C.)

While the public needs to grasp a basic understanding of ozone, factual statements are not sufficient to generate behavioral changes towards reducing the levels of ambient ozone. Behavioral changes will only result if the EPA's "message" motivates people and alters their natural resistance to change (U.S. EPA, "Communicating Radon Risk Effectively," 1989).

In a nutshell, the EPA must communicate three elements of an educational campaign by: 1) identifying the environmental factor--tropospheric, not stratospheric ozone; 2) providing the public with information on the health and welfare effects of ozone; and 3) informing the public about what people can do to help reduce ambient levels of ozone.

As to the first element, the general public does not understand the difference between stratospheric ozone, which

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[3] The EPA considers an area in compliance if, on a 3-year average, it does not exceed 0.12 ppm of ozone for more than one hour a year.

exists in the upper layer of the atmosphere, and tropospheric ozone, which exists in the lower layer of the atmosphere. The former is vital to a healthy planet, the latter detrimental to human health and agriculture.

The confusion stems from the fact that the same word describes two different environmental factors. To clarify the distinction between the two environmental factors, the EPA could supplement the name "ozone" with descriptive adjectives which vividly depict its harmful effects.

The "acid rain" campaign is a good example of this tactic. The general public did not pay attention when scientists warned about the environmental risks associated with acidic precipitation and deposition. But when the same environmental topic was packaged as "acid rain," the public became outraged. A previously unknown hazard became a household name.

The EPA could have an immediate impact on the public if it gave a stronger, harmful sounding name like "poisonous ozone," "noxious ozone," or "toxic ozone."[4]

Once the EPA has caught the public's attention, it must follow up with information concerning the health and welfare effects of poisonous ozone. Health studies show that people exposed to levels of tropospheric ozone of 0.12 ppm are at risk of long-term lung damage. Inhaled ozone is associated with an inflammatory

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[4] The point here is not which word is selected, but rather that the EPA use **some** additional word(s) when referring to lower level ozone to help differentiate between the good and the bad.

response which reduces the lung's ability to clear out infectious agents and toxins and can aggravate asthma (McLoughlin et al, 1989). People with respiratory diseases (such as asthma, bronchitis, emphysema) and athletes who regularly engage in aerobic exercise during peak ozone times are at high risk. Studies of track athletes correlate high ozone levels with inferior performance (Pryde, 1973).

In 1988, an estimated 137 million Americans (60.5 percent of the resident U.S. population) live in nonattainment areas (U.S. EPA estimate, 1989). Regionally, over 92 percent of New Englanders (11 million out of 12 million) live in areas that exceed the poisonous ozone standard. In areas occupied by more than 50 percent of the U.S. population, current peak ambient ozone concentration levels were sufficient to change lung function, worsen respiratory symptoms, and inflame airways in healthy people engaged in outdoor activities (Lippmann, 1989).

While there is no concrete evidence that acute exposure to poisonous ozone directly kills people, there is evidence that poisonous ozone mixed with other chemical pollutants can have a lethal effect. Poisonous ozone is the main ingredient of smog. According to the California Air Resources Board, "Smog may be a contributing factor to the 80,000 deaths from heart and lung diseases each year in California" (Levy, 1988).

Historically, there are some extreme events where air pollution, trapped near the Earth's surface, claimed the lives of innocent victims. In Donora, Pennsylvania (1948), a heavy smog

settled over the area creating an inversion layer[5] that trapped air pollutants near the Earth's surface. As a result of a five day smog episode, 5,910 residents (or 42.7 percent of the population of the Donora area) reported some acute effects from smog. Tragically, twenty people died (Schrenk, 1949). The elderly and those with heart and lung disease were the most vulnerable. Many reported coughing, chest constriction, breathlessness, burning eyes, and vomiting.

Air pollution also affects plants. Studies have shown that poisonous ozone harms some tree species, such as the eastern white pine (Pinus strobus), and causes needle stippling or lack of pigmentation (Woodman and Cowling, 1987). Regional poisonous ozone has contributed to a 4 - 5 percent decline of native eastern white pines growing naturally throughout the northeast area (Skelly, 1988). Important cash crops--such as corn, wheat, cotton, soybean, and peanuts--show a proportional yield decrease as levels of ozone concentrations increase. This, in turn, creates an agricultural loss of 2 - 3 billion dollars a year nationally, or 5 - 10 percent of the national production (Mackenzie and El-Ashry, 1988). In New England, the agricultural loss is estimated to be greater than 12 million dollars a year (Maldonato, 1988).

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[5] An inversion occurs when a layer of warm air forms above a cooler air mass. Inversions trap pollutants close to the ground and prevent them from dispersing vertically.

Among a number of other damaging effects of poisonous ozone are: shortened useful life of rubber and textiles due to cracking and fading, changes in dyes, and premature cracking of paint (Pryde, 1973).

It is not enough to tell the public that ozone is poisonous. Solutions must be offered so that the public does not feel helpless, become frustrated, and do nothing about it. With poisonous ozone, individuals can make a difference. Certainly, all the technology in the world--without the cooperation of the public--cannot make the problem go away.

An example of a successful, on-going communications strategy that grabbed the public's attention is the anti-smoking campaign. The success of this campaign stems from several factors: 1) there is an overwhelming body of scientific literature supporting the risks posed by smoking; 2) the Surgeon General and the American Lung Association (ALA) waged a persistent, long-term educational campaign; and 3) the Surgeon General and the ALA "personalized" their message by informing the public that both active and secondary smoking affected each and every person's lungs. Using the anti-smoking campaign as an example, the EPA should include sound scientific data on the health effects of poisonous ozone in its message, use persistent, multiple communications sources, and graphically illustrate the risk to individuals.

"Packaging" a Communications Strategy

The suggestions mentioned above can be contained within a catchy communications campaign name. Just as "Kick the Habit" is synonymous with the anti-smoking campaign, there should be a memorable phrase for poisonous ozone. One suggestion is calling the campaign, "The Lowdown on Poisonous Ozone." The word "lowdown" not only implies "the inside facts" but also reminds people that this ozone is found in the **lower** level.

For "The Lowdown on Poisonous Ozone," recommendations are made using three major communication channels: the media (television, radio, and print), educational programs, and associations/organizations.

SECTION 2: USING THE MEDIA TO GET THE MESSAGE OUT

The three most powerful media are television, radio, and print. There are several ways the EPA can use these media to increase the public's awareness of the health effects of poisonous ozone. Some of the strategies apply to all three media;[6] whereas, others only to one or two.

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[6] See Appendices E and F for listings of cities with television stations in New England and radio stations in Massachusetts, respectively. Appendix G lists newspaper offices in New England.

One condition that applies to all three media and is a significant strategic asset is the "seasonal" nature of poisonous ozone. Since poisonous ozone episodes occur between May and September, the media receives a newsworthy event each summer.

One way to take advantage of the onset of the poisonous ozone season is to hold press conferences in major metropolitan cities in order to dramatize the problem. The purpose of the meetings would be to give press members--reporters, announcers, producers, editors, and writers--pertinent background information. It would be desireable to hold such meetings featuring people (e.g. respiratory physicians and/or people with respiratory problems) or places (e.g. images of environmentally damaged areas, such as: Acadia National Park or Mt. Mitchell) to illustrate the destructive nature of poisonous ozone.

There are efficient ways the EPA could distribute information to professionals in the television, radio, and print media. The Agency could hold press conferences, "brown bag" (informal and inexpensive) luncheons, editorial board meetings, and/or sponsor an annual environmental forum for members of the press. Each attendee could receive a poisonous ozone media kit. Suggestions for materials in the media kit are:

1. **fact sheet(s) on the health/welfare effects** of ozone, explained in layperson's terms to the reader with recommendations for reduced activity; a fact sheet on conditions and sources that create poisonous ozone (this does not have to be scientific, but should force people to make the connection that cars worsen the problem).

2. **a list of names and telephone numbers** of EPA experts who could be contacted during the work day and, if possible, during the non-workday and evening hours; a list of non-EPA local experts, (i.e. American Lung Association, physicians, botanists), and state contacts on air quality data, control technology, planners, etc.;

3. **a glossary of scientific terms and EPA acronyms** that reporters could refer to when trying to decode an explanation given to them by an expert;

4. **a list of suggestions on what individuals can do** to help reduce poisonous ozone levels (see Appendix C as example). People need to understand that everyone is responsible for environmental problems and that each person can make a small contribution;

5. **readable charts/graphics** that convey poisonous ozone information such as a comparison of this year's poisonous ozone levels with last year's (graphics to use could be on ozone formation, chemistry, and meteorology; map of the monitors, locations and past violations; an illustration depicting the upper and lower ozones; sources that contribute to poisonous ozone formation); and

6. **essays or briefings by experts** that would explain various aspects of specific poisonous ozone health and/or welfare effects (Sandman et al, 1987).

Many reporters emphasized that the information in the media kit should be written in easy to understand language--avoiding technical jargon (Kearney). Scientific data that is communicated in non-technical, visually descriptive terms is more effective than pure scientific facts. A recent article in The New York Times Sunday Magazine called "L.A. Fights For Breath," illustrates this with the statement that "...autopsies...of accident victims aged 15 to 25,...increasingly resemble the lungs of 40-year old emphysemics" (Weisman, 1989). This example has a greater impact on its audience than a statement that simply states: "Poisonous ozone causes premature aging of the lungs."

It is appropriate to "localize" the poisonous ozone information in the media press kit as much as possible. Localizing risk information puts it in personal terms so that people can overcome their perception of immunity: "It won't happen to me" (U.S. EPA, "An Evaluation of Radon Risk Communication Approaches," 1988). The general public wants to know where their communities stand in relation to healthy/unhealthy air quality (Dumanoski). Broad statements like "[number] of cities in Massachusetts exceeded the NAAQS standard for poisonous ozone" are not as effective as: "In the [town] of [state] during the summer of 1989, there were [number] of days where poisonous ozone standards were exceeded."[7]

A message that is targeted to a specific audience (or sub-group of the population) is much more effective than a "canned" message aimed at reaching a mass population (U.S. EPA, "Communicating Radon Risk Effectively," 1988).

Television

Of all the media, television has the greatest impact because it is both visual and auditory. In studies where television, newspapers, and radio produced conflicting stories, the public perceived television to be the most credible source of information (Scheiner et al, 1981). This observation is

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[7] To date, the EPA Region 1 office has only 40 monitors. Until more monitors are added, the EPA could narrow the information to apply to states, counties, or monitor-location, when appropriate.

buttressed by the fact that television has replaced newspapers as the prime source of information for most Americans. On average, TV news viewing has increased from 20 minutes in 1965 to 27 minutes in 1975, while newspaper usage decreased from 33 to 26 minutes during the same period (Jamieson and Campbell, 1988).

The nightly news provides a tremendous opportunity to reach the general public. Weather reporters have and could increasingly become an essential source of public information regarding poisonous ozone, especially since a large population watches (or listens) to weather reports. Weather reporters could help communicate air quality information on days when poisonous ozone levels are exceeded. Additionally, they could explain how winds transport poisonous ozone from one region to another just as they transport precipitation.

Public service announcements (PSAs) provide another means for the EPA to use TV to educate the public. The general consensus regarding PSAs is that they can be effective--but only if they reach a sizable audience. Because producers do not pay for air time, they have no authority over its placement. Stations tend to air PSAs during unpurchased timeslots, early morning or late at night. Television PSAs will not produce the widespread exposure to poisonous ozone information that a television news or prime-time series will (Jamieson and Campbell, 1988). Therefore, PSAs are not recommended for an ozone communications strategy.

Another way to promote television coverage is to work with TV producers in the production of a television series on poisonous

ozone (or air pollution). Television series provide an effective communications channel, and if produced properly, can sway the audience to make behavioral changes. A Finland study showed that a weekly television series on health topics brought about behavioral health-related changes (e.g. smoking cessation and weight loss)(U.S. EPA, "Communicating Radon Risk Effectively," 1989).

The EPA Headquarters is experimenting with an innovative marketing approach for a television series on recycling. EPA Headquarters contacted a Minneapolis television asking them to produce a series and the message on recycling; EPA experts would provide technical advice. The resources would be paid for by a number of corporations. Depending on the success of this venture, this project could set an example for future initiatives with other stations.

On a smaller scale, poisonous ozone could be one segment of an ongoing science or health series such as a program on air pollution. As in the Minneapolis station example, the EPA could impart technical support, a station could produce the series, and a corporation could finance the production.

On a larger scale, producer Norman Lear has spearheaded the formation of Environmental Media Association (EMA), a non-profit organization composed of producers, writers, and directors. The Association is looking into ways it can promote environmental issues through sitcoms or other series. The EPA could

collaborate with EMA by providing media kits or other information.

Radio

Broadcast radio can be easily used to communicate about poisonous ozone through hourly newscasts and talk shows (U.S. EPA, "An Evaluation of Radon Risk Communication Approaches," 1988). On a daily basis, broadcast radio reaches the largest segment of the population (Corrado, 1989). For news and editorial coverage during prime-time, drive-time (6:30 - 9:30 a.m.; 4:00 - 7:00 p.m.), the listening audience consists primarily of commuters. During the day, radio broadcasting reaches a wide segment of the population those who listen at work, home, leisure, and traveling in their cars. Studies show that an audience's defenses to persuasive communication are lower when listening to radio in relation to other forms of communication (Scheiner et al, 1981).

EPA employees could solicit invitations to appear on talk shows.[8] Arranging interviews requires advance work by staff but are not difficult to arrange. The only costs are the employee's time.

Radio provides EPA officials a powerful communications channel. EPA official(s) can explain in their own words the health and welfare effects of poisonous ozone. A live broadcast

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[8] See Appendix F for a list of radio talk shows in New England (Massachusetts).

leaves no opportunity to edit so that the EPA official need not be concerned about being misquoted or misrepresented.

Most radio talk shows are not interested in technical information on poisonous ozone or air quality. But they are interested in basic information that is beneficial to their listeners--helpful hints on what their listening audience can do about easing the heat and respiratory strain during an poisonous ozone episode. The EPA can provide basic information on levels and sources and helpful common-sense hints for people with respiratory diseases, the elderly, children, and healthy exercising adults.

Print

Newspaper Articles and Editorials:

According to statistics, 62 percent of the adult population reads a newspaper on a daily basis. On an average Sunday, the number increases to 65 percent (Jamieson and Campbell, 1988). Although the material read is normally retained for just a short amount of time, the print medium offers a more permanent form of communication. Readers can peruse articles at their leisure and can re-examine and save the materials (Scheiner et al, 1981).

There are regular newspaper features (such as the weather section) that the EPA could utilize as an educational tool to explain poisonous ozone and its affects on air quality (occasionally The Boston Globe lists air quality information in the weather section). Poisonous ozone or air quality data could

be listed under the Pollutant Standards Index (PSI) or Air Quality Index (AQI) column. The daily poisonous ozone prediction could be part of the weather synopsis on the front page of every newspaper.

The media kit (described on pages 14 - 15) could be the primary background source of information provided to reporters. However, the kit will only be effective if the reporter receives it during a time when he/she is covering a story on poisonous ozone. Consequently, timing is critical. The EPA could send the kit early in the season and/or send selected pieces of information during poisonous ozone episodes (Dumanoski, 1989).

Another way the EPA can promote "The Lowdown on Poisonous Ozone" is through news editorials. The Air Quality Office and the Public Affairs Office could write and submit editorials on a monthly basis from May through September, informing readers about the health and welfare effects of poisonous ozone and what the individuals can do about it. These articles could be submitted to newspapers, weeklies, and newsletters. Either the EPA could "ghost write" editorials--by submitting them to a publication under the name of the paper's editor--or the EPA could send letters to the editors to be published under the EPA's name. The articles should be tailored to the type of publication used. Additionally, the story should provide poisonous ozone data for the relevant region.

The EPA could target specific areas that have poisonous ozone exceedences (like the Quabbin Reservoir and Truro, both in

Massachusetts). An EPA staff member could go on a "road show" to visit areas in New England where smaller papers with limited staff might not be able to send reporters to Boston.

Editorials, question-and-answer columns, and press releases need to be submitted to numerous publications. Editors for weekly publications are usually looking for a story to print, so the chances of printing a poisonous ozone story are relatively high. Likewise, there is a greater chance that news-hungry, local newspapers--as opposed to major papers--will publish editorials.

While writing and sending articles is time consuming, the author's time is the only real cost. The print medium is a low-cost source of information that reaches a large audience.

Advertising:

In contrast to newspaper articles and editorials, advertising involves relatively little Agency labor but relatively greater, quantifiable production and dissemination costs. There are a number of ways to advertise using print. A list of print options and production cost estimates include:

BROCHURES/PAMPHLETS:

Colorful brochures can provide an audience with detailed information about ozone that the reader can keep. In addition to EPA's existing brochures: "Ozone, Smog and You," and "Ozone in the Lower Atmosphere: A Threat to Health and Welfare," a new brochure on ways individuals can reduce poisonous ozone levels could be developed.
(Production costs vary depending on colors, etc.)

POSTERS:

One or two-color or black-and-white posters are effective for conveying basic information to the public. Posters can also be used in schools for educational purposes.

(Quote from Royal Screen Printing in Roslindale, Massachusetts: for approximately 200 posters, one color, no photo inset, printing costs are approximately $420. As the quantity of the order increases, the price per poster decreases.)

PUBLIC TRANSIT & TRANSPORTATION POSTERS:

Two different sizes of public transit and transportation posters are available, 11" by 28" for inside vehicles, and 46" by 60" outside vehicles and/or on subway/bus station platforms.

(Quote from Combined Media Communications in South Quincy, Massachusetts: for 11" by 28," $9.00 per card--includes 50% off for public service clients, discount only for this size. Costs for larger posters 46" by 60" is approximately $300 per poster card per month for one location.)

BILLBOARDS:

Billboards posted along major highways and in Boston communities can convey a catchy message or phrase on ozone.

(Quote from Ackerly Communications in Stoneham, Massachusetts: for 10 "posters units" that are 12' by 25', two color, straight line copy, printing costs are approximately $600. Add a complicated graphic and costs are approximately $1,200 - $1,500. For copy and symbols, costs could run between $900 - 1,000. All estimates can be given before work is done.

For public service clients, Ackerly donates cost of renting space on a billboard which is $500 - $1,000 per month per billboard. However, there is a "posting" fee per billboard per month which is $105.)

BUMPER STICKERS:

Bumper stickers are ideal for short, catchy phrases.

(Quote from Allied Marketing Association in Wellesley, Massachusetts. There are 6 different sizes available. The most common size is 3" by 11½". The minimum order is 125. $1.08 each for one color and white or $135 for 125 stickers, plus labor and art costs. Price per sticker decreases as quantity ordered increases.)

SECTION 3: SUPPORTING ACADEMIC INSTITUTIONS

Educational Programs for Children

A major shortcoming of the media is that it does not necessarily educate--but rather it informs--the public. The complex nature of ozone--the difference between stratospheric and tropospheric ozone, the fact that poisonous ozone is invisible, and its many contributing sources--can be thoroughly addressed through educational programs. An educational program that reaches students is extremely important especially since students form opinions in their formative years of development that they can retain for a lifetime (Scheiner et al, 1981). They, in turn, can educate their parents about poisonous ozone.

The key to a successful, dynamic educational program is creativity. There are some impressive creative programs in place throughout the United States. Rather than create an educational program from scratch, the following examples of health related educational programs provide ideas for an EPA educational kit that can be aimed at primary and secondary school children. (Please refer to Appendix H for a list of existing programs.)

Poem and Poster Contest:

The EPA Region 1 is involved with the Poem and Poster Contest in which grades K through 6 submit a poem and/or poster on an environmental topic. Currently, the teacher chooses the topic. Instead, the EPA could select a

specific environmental issue, such as: air pollution, or ozone--the "good" and the "bad." By specifying a topic, students would potentially learn more about a particular area through their research efforts and through other classmates.

Adopt-A-School Program:

The "Adopt-A-School Program"[9] yields a worthwhile opportunity for EPA staff to interest students in environmental topics. The EPA Headquarters has a successful "Adopt-A-School Program" currently in place. EPA staff volunteer their time during the school year to provide six months of environmental educational activities capped with a day-long Environmental Day at the school. Some of the Environmental Day activities have included:

1. Exhibition hall for displays and demonstrations for various EPA officers.
2. Simulated town meetings challenging students to debate and vote on local developers vs. environmental protection.
3. "Environmental Bingo" -- Questions and Answers game dealing with environmental issues and careers.
4. Computer demonstrations (EPA Times, 1989).

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[9] Adopt-A-School is part of a larger two year program called "Partners in Education."

Clean Air for Kentucky Program:

A most creative and unique air quality program developed by the Kentucky Department for Environmental Protection (DEP) is called "Clean Air for Kentucky" (see Appendix H for reference). As part of the air pollution school program, the DEP has developed an educational kit. The kit contains cartoon "gremlins" with imaginative names so children enjoy learning about air pollutants. The gremlins characterize different types of pollutants from "Odious Ozone" to "Cranky Carbon Monoxide." Each gremlin comes with an informational card describing the type, source, and health effects of each pollutant. Bookmarkers, bookcovers, games, puzzles, and experiments are included in the educational kit.

The educational kit is sent to interested school teachers. (There is information for grade school through high school). Upon completing a lesson(s) on air pollution, the class is eligible for a visit by the "Clean Air Balloon" (a hot-air balloon) to visit their school. At each visit, the DEP's Air Quality staff presents a short lesson on Kentucky's air quality. The students then receive materials on clean air and what they (and their parents) can do to help protect it.

Another component that makes the programs listed above successful is that they actively involve the students. Some

additional suggestions for "active" student participation include:

1. A field trip to EPA monitoring station.
2. A student contest to design an advertising campaign that heightens people's awareness of poisonous ozone (or a campaign aimed at getting people to drive less).
3. A campaign to come up with a name and essay for an Air Pollution character (the Kentucky program sponsored a contest. The winner, a sixth grader, invented "Captain Z.A.P." for Zap Air Pollution). This campaign could be a variation on the Poem and Poster Contest.
4. A photo contest of air pollution sources (that Captain Z.A.P. can "zap").
5. A Junior Ranger Program on poisonous ozone (the National Park Service in Acadia, Maine has a Junior Ranger Program on Acid Rain).

In order to get teachers involved in environmental education, the EPA could network with teachers' organizations by providing them with educational kits and/or conducting seminars. Some examples of teachers organizations are the Massachusetts Teachers Association and the Massachusetts Parent-Teacher-Student Association. Each association could publish in their newsletter information about the EPA's educational program.

The educational kit could be sent to school principals and/or science teaches. However, the timing <u>when</u> schools receive the kits is equally important. September is not a good month to send the kit since school is starting; similarly, June is not good either as school is ending. The EPA could therefore contact schools early in the school year for teachers to schedule air

pollution/poisonous ozone lessons (October or November is a good time to contact them).

Educational Programs for Adults

Educational efforts should not be exclusively for school students. The EPA could reach a segment of the adult population by expanding its public speaking efforts at meetings, organizations, and by establishing a speakers' bureau. Undergraduate and graduate environmentally-related courses at colleges and universities also provide opportunities to address receptive, interested and educated audiences.

When outside organizations request EPA Region 1 speakers, the most commonly requested topic is on air pollution (Sullivan, 1989). To facilitate speaker requests, the Air Quality Office could create a list of willing speakers with a brief description of topic(s) they could speak about. Ideally the person who imparts the message is knowledgeable about ozone. In public speaking presentations, the speaker should be able to field audience questions. Clear, effective communications skills are as equally important as the person's expertise (U.S. EPA, "An Evaluation of Radon Risk Communication Approaches," 1988). To this end, the speakers listed should be trained in public speaking.

The EPA could contact numerous organizations, such as the Rotary Club, League of Women Voters, The American Lung Association, etc. requesting them to place EPA employees on their

speakers' lists. Upcoming talks could then be publicized in newspapers such as the Boston Globe's Calendar section, free of charge.

Public speeches can be greatly enhanced by the use of 35 mm slides. A slide show ensures consistent delivery of accurate information. Colorful slides depicting charts and graphics help an audience understand a complex topic and hold their attention. In addition to slides, an audio tape can be developed for cases when a speaker is unavailable, the slide show can still be shown. The audio-visual show could then be converted into a video tape for organizations and schools to borrow.[10]

While preparing and scheduling public speaking events are time-consuming, the only real costs are the speakers' time. Providing public speakers is good public relations for the EPA since it shows a commitment to the environment and community.

SECTION 4: WORKING WITH ASSOCIATIONS & ORGANIZATIONS

Civic and community associations are excellent resources for developing, designing, and/or disseminating environmental information. One such resource is the American Lung Association (ALA) of Massachusetts. They are particularly interested in working jointly with the EPA to expand the ALA's Lung Health

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[10] To date, the EPA Region 1 office is currently developing a slide show on ozone.

Modules--an educational program aimed at grades K through 4--for grades 5 through 8. Part of the success of the ALA's Modules stems from two animated characters----Octopuff and Pollution Hound--who unravel tales about smoking and air pollution. The Modules have colorful posters, illustrated stories, easy-to-do experiments, and numerous games and puzzles. The current Modules provide grades K - 4 with some information on air pollution. The EPA could work with the ALA in developing Modules that introduce poisonous ozone to older grades.

Another way the EPA can educate the public about poisonous ozone is by working with environmental organizations that have an interest in air pollution. The EPA can sponsor workshops and/or presentations for associations and organizations. In addition to educating them about poisonous ozone, the EPA can "test" the group's response to a message, slide show, or educational program that the EPA is developing. Associations and organizations can provide the EPA with invaluable feedback which will help make a message even stronger.

The poisonous ozone message is more likely to be heeded if it comes from a source that is trusted and unbiased. In a community context, credibility can be heightened if the source is endorsed by a well respected leader (U.S. EPA, "An Evaluation of Radon Risk Communication Approaches, " 1988). The EPA could spearhead an effort to publicize health effects of air pollution/poisonous ozone to public health officials. They could become more involved in communicating about the health risks associated with

unhealthy air quality. Submitting articles to boards of health provides public health official with the necessary background information on poisonous ozone.[11] Therefore, the EPA could involve public health officials and encourage them to notify towns where the ozone level has exceeded the NAAQS and what the health effects are.

SECTION 5: THE "EARTH DAY" EVENT

The twentieth anniversary of Earth Day, Sunday, April 22, 1990, is a golden opportunity for the EPA to combine educational efforts and media plans with Earth Day events. Some of the efforts already underway at EPA need not be duplicated. Ann Boren is coordinating Earth Day events at Headquarters and Sally Edwards in Region 1, and they can be contacted for further information (see Appendix B for addresses and phone numbers). Although most of the Earth Day projects are still in the preliminary stages, a few examples of events that are being considered include: a Clean Air Week, 10k run, and a Walt Disney-created cartoon character that is environmentally-conscious.

The television network station, CBS, plans to celebrate Earth Day. The EPA and CBS are discussing the possibility of producing

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[11] The Massachusetts Health Officers Association, Inc. publishes "The Official Roster of Boards of Health for Massachusetts. See Appendix B for more information.

a year-long series on "Environmental Minutes." Since both parties are in the initial negotiating stages, the environmental topics are still being determined. EPA Regional Administrators will be asked to submit memos on recommended topics for the series. The Air, Pesticides and Toxics Management Division could submit a memo to Ann Boren to have an "Environmental Minutes" show on "The Lowdown on Poisonous Ozone."

SECTION 6: CONCLUSION

Based on the foregoing research, I recommend that the ozone message contain three essential objectives that:

1. differentiate between stratospheric and tropospheric ozone by referring to the latter as "poisonous ozone" in all its communications;
2. cite scientific evidence when warning the public about the health and welfare effects of poisonous ozone; and
3. publicize what individuals can do to make a difference.

Ideally, the best way for the message to reach a wide and diverse audience is through many communications channels; however, this approach may not be realistic due to the EPA's limited staff and resources. Given these facts, two communications channels are recommended.

First, I recommend that the most efficient communication tool is the news media. The news media is a short-term approach because it grants immediate coverage that reaches a wide and

diverse audience. The EPA radon report attributes the news media as being the most effective communications channel for increasing people's awareness of radon (U.S. EPA, "An Evaluation of Radon Risk Communication Approaches," 1988).

In order to use the media, the EPA must develop a media kit described in Section 2. The EPA could hold press conferences for the news media and distribute the kits. Press conferences could be held during times when there is a media "event" regarding ozone (i.e. to communicate ozone exceedences, to report trends, or to release data). Additionally, the EPA could schedule press conferences each spring at the beginning of the ozone season.

Second, I recommend that the EPA develop an academic curriculum to educate the younger generation through schools as discussed in Section 3. The educational program is a long-term approach because it takes time to teach children and for assimilated information to be translated into action. Well educated children grow up to be well educated adults.

In order to work with school systems, the EPA must develop an educational kit providing teachers with creative lesson plans. The EPA could facilitate its educational efforts by enjoining forces with community/civic organizations that have the expertise on educational programs.

Based on the literature review evaluating the effectiveness of communications materials, neither mass media or educational kits used exclusively would be powerful enough to evoke human lifestyle changes (U.S. EPA, "Communicating Radon Risk

Effectively," 1989). Instead, a combined media and educational approach would be the most effective.

APPENDICES

Appendix A: Bibliography

Appendix B: List of Contacts

Appendix C: What You Can Do To Help Reduce Ozone

Appendix D: List of Communications Tools

Appendix E: List of Television Stations in Metropolitan Areas of New England

Appendix F: List of Radio Talk Shows in Massachusetts

Appendix G: List of Newspaper Offices in Metropolitan Areas of New England

Appendix H: Existing Educational Program Examples

Appendix I: Strategy for Constructing a Message Using Mass Media

APPENDIX A

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APPENDIX B

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APPENDIX C

WHAT YOU CAN DO TO HELP REDUCE GROUND-LEVEL OZONE

Actions Individuals Can Take:

1. Car pool, curtail use of automobile or plan the use carefully to minimize the amount of use, use public transportation.
2. Be sure car is well tuned.
3. Accelerate slowly to conserve on the amount of fuel you use.
4. Use latex paints instead of oil based paints.
5. Use solventless cleaners and dispose of solvents that you do use properly (not down the drain).
6. Do not leave petroleum products (degreasers, solvents, oil based paints, etc.) in open containers.

How To Stay Comfortable During An Ozone Exceedance:

1. DO NOT engage in heavy exercise or strenuous work.
2. Stay indoors, preferably in an air conditioned space, where ozone levels are 10% of what they are in the ambient air.
3. If you must exercise, do so early in the morning, preferably before the 6-9 am morning rush hours.

For More Information:

1. You may call for the Pollutant Standards Index (PSI) on air quality in Massachusetts, the number is 1-800-882-1497 or call the American Lung Association. If the Air Quality Index AQI is rated good to moderate (under 100 on the scale), air quality is considered acceptable. If it is greater than 100 and called unhealthful (100-200), people with heart and/or respiratory ailments should reduce physical activity.

APPENDIX D

LIST OF COMMUNICATIONS TOOLS

MEDIA

Television:

* Nightly News
* Weather Reports
* Public Service Announcements
* Television Series
* Environmental Media Association
* Paid Advertising

Radio:

* Newscasts
* Weather Reports
* Talk Shows
* Public Service Announcements
* Paid Advertising

Print:

* News Articles
* News Editorials
* Weather Columns
* Question-and-Answer Columns
* Press Releases

Print Advertising:

* Brochures
* Pamphlets
* Posters
* Public Transit & Transportation Posters
* Billboards
* Bumper Stickers

EDUCATIONAL

School Programs:

* Poem & Poster Contest
* Adopt-A-School Program
* Clean Air Program

EDUCATIONAL - CONTINUED

Adult Programs:

* Public Speaking Events
* Graduate/Undergraduate Courses
* Slide Shows
* Videos

Organizations/Associations

* Workshops
* Presentations

THE "EARTH DAY" EVENT **

* Clean Air Week
* 10 k Run
* Walt Disney-created Cartoon Character
* CBS's "Environmental Minutes"

** As of August 1989, many Earth Day events were still in the negotiating stages.

APPENDIX E

LIST OF TELEVISION STATIONS IN MAJOR METROPOLITAN AREAS OF NEW ENGLAND*

Connecticut

Hartford

WFSB-TV
3 Constitution Plaza
Hartford, CT 06115
(203) 728-3333
Affliation: CBS

New Haven

WTNH-TV
8 Elm Street
New Haven, CT 06510
(203) 784-8888
Affliation: ABC

West Hartford

WVIT-TV
1422 New Britain Avenue
West Hartford, CT 06110
(203) 521-3030
Affliation: NBC

Maine

Bangor

WABI-TV
35 Hildreth Street
Bangor, ME 04401
(207) 942-8321
Affliation: CBS

WLBZ-TV
P.O. Box 934
Bangor, ME 04401
(207) 942-4822
Affliation: NBC

* Partial list from Burrelle's New England Media Directory 1988, or write to: Burrelle's Media Directories, 75 East Northfield Road, Livingston, NJ, 07039. Phone Number (201) 992-6600.

Portland

WGME-TV
1335 Washington Avenue
Portland, ME 04103
(207) 797-9330
Affliation: CBS

WMTW-TV
119 Middle Street
Portland, ME 04112
(207) 775-1800
Affliation: ABC

Massachusetts

Boston**

WBZ-TV
125 Western Avenue
Boston, MA 02134
(617) 787-7000
Affliation: NBC

WNEV-TV
7 Bullfinch Place
Government Center
Boston, MA 02114
(617) 725-0777
Affliation: CBS

Needham

WCVB-TV
5 TV Place
Needham, MA 02192
(617) 449-0400
Affliation: ABC

** "1 Norway Street" produced by The Christian Science Monitor occassionally has environmental specials. For more information contact Lynn Chamberlain (Producer) at (617) 450-2868 or Sandy Strickland at (617) 450-2812, or write: "1 Norway Street," Christian Science Monitor Syndicate, Inc., 1 Norway Street, Boston, MA 02115.

New Bedford

WLNE-TV
430 County Street
New Bedford, MA 02741
(617) 992-6666
Affliation: CBS

Springfield

WGGB-TV
1300 Liberty Street
Springfield, MA 01104
(413) 733-4040
Affliation: ABC

WWLP-TV
P.O. Box 2210
Springfield, MA 01102-2210
(413) 786-2200
Affliation: NBC

New Hampshire

Concord

WNHT-TV
P.O. Box 2100
Concord, NH 03301
(603) 225-2100
Affliation: CBS

Manchester

WMUR-TV
50 Phillip Cote Street
Manchester, NH 03101
(603) 623-8061
Affliation: ABC

Rhode Island

East Providence

WPRI-TV
25 Catamore Boulevard
East Providence, RI 02914
(401) 438-7200
Affliation: ABC

Providence

WJAR-TV
111 Dorrance Street
Providence, RI 02903
(401) 751-5700
Affliation: NBC

Vermont

Burlington

WCAX-TV
P.O. Box 608
Burlington, VT 05402
(802) 658-6300
Affliation: CBS

WVNY-TV
P.O. Box 22
Burlington, VT 05401
Affliation: ABC

APPENDIX F

RADIO TALK SHOWS IN MASSACHUSETTS*

AMHERST

WFCR

Around New England; 4:40-5 p.m. M-F
Producer: Doug Berman; 545-0100

WMUA

Focus; 6-7 pm; Monday
Producer: Ken Mosakowski; 542-2876

U-MASS Hotline; 6-7 pm; Wednesday
Producer: Bill Stepchew

Reports in Color - 3rd World; 6-7 pm; Saturday
Producer: James Neill

WTTT

Conversations; 12:30-1 pm; Mon-Fri.
Producer: Don Freeman; 256-6794(end)

ATTLEBORO

WARA

Ron Struminski Show; 6-8 pm; Mon-Thurs.
Host and Producer: Ron Struminski; 222-1113

Glee Show; Noon - 3 pm; Mon-Thurs.
Host and Producer: Glee; 222-1113

Dave Kane Show; 9-noon; Mon-Fri.
Producer: Dave Kane; 222-1113

Tom Domer Show; 10am-2pm; Saturday
Host and Producer: Tom Domer; 222-1113

Rena Gordon Show; 2pm-6pm; Sunday
Host and Producer: Rena Gordon; 222-1113

* For more information on radio stations listed throughout New England see Burrelle's New England Media Directory 1988, or write to: Burrelle's Media Directories, 75 East Northfield Road, Livingston, NJ, 07039. Phone Number (201) 992-6600.

Sunday Paper; 2pm-6pm; Sunday
Host and Producer: Glee 222-1113

Radio Free America; 2pm-6pm; Sunday
Host and Producer: Donna Sprague

BEVERLY

WNSH

Voxpop; 10-noon; Saturday
Producer: Dick Matterson; 774-7000

Checks and Balances; 9-10 am; Saturday
Producer: Fred Liber; 774-7000

BOSTON

WRKO

Morning Show; 5:30-10 am; Mon.- Fri.
Producer: Scott Pare and Kevin Straley; 236-6825
Hosts: Ted and Janet

Mid Day: 10am-2pm; Mon.-Fri.
Producer: Cheryl Gipstein; 236-6825
Host: Gene Burns

The Jerry Williams Show; 2-6pm; Mon.-Fri.
Producer: Paula O'Conner; 236-6825

WMEX

Money Talk; 9am-1pm; Sunday
Host and Producer: Mike Tulman; 423-1761 or 542-0241

WMJX

Boston Life 8am-Noon; Saturday
Host and Producer: Jenette Kerr; 423-1761 or 542-0241

106.7; 8am-9 or 9:30am; Sunday
Host and Producer: Rod Fritz; 423-1761 or 542-0241

WROR

Sunday on ROR; 8-9am; Sunday
Producer: Don LaTulip; 236-6865

New England Newsmaker; 9-9:30am; Sunday
Producer: Bob McNeil; 236-6865

Boston Neighborhood Forum; Midnight Sunday-12:30 Monday
Producer: Dr. Joe Warren; 236-6865

Boston's Other Voice; 12:30-1am; Monday
Producer: Dennis Idarola; 236-6865

Mass Comm; 1-2am; Monday
Producer: Don LaTulip; 236-6865

WHDH

The Larry Glick Show; 9am-1pm; Mon.-Fri.
Producer: John O'Neil; 267-1313; Host: Larry Glick

WBZ

The Peter Meade Show; 6-9pm; Mon.-Thur. Sat.
Producer: Kevin Meade; 787-7261; Host: Peter Meade

The David Brudnoy Show; 9pm-1am; Mon.-Thrs. and 6pm-12am; Fri.;
Producer: Peter Meade; 787-7261; Host: David Brudnoy

The Lovell Dyett Show; 9pm-1am; Sat.;
Producer: Peter Meade; 787-7261; Host: Lovell Dyett

The George Bachrach Show; 9pm-1am; Sat.;
Producer: Peter Meade; 787-7261; Host: George Bachrach

The Joe Keller Show; 6-9pm; Sun.;
Producer: Peter Meade; 787-7261; Host Joe Keller

WBCN

The Boston Sunday Review; 7-noon; Sunday
Producer: Matt Schaffer; 437-1920; Host: Matt Schaffer

CONCORD

WIQH

Public Service Shows; 3-5pm; Sunday
Producer: Lee Upton 369-8429 (after 4pm)

FALL RIVER

WALE

The Rob Michaels Show; 9am-12pm; Mon.-Fri.
Producer: Jim Mandly; (508) 674-3535; Host: Rob Michaels

The Gloria Kennedy Show; 12-3pm; Mon.-Fri;
Producer: Jim Mandly; (508) 674-3535; Host: Gloria Kennedy

The Bill Silvia Show; 3-5pm; Mon.-Frid.
Producer: Jim Mandly; (508) 674-3535; Host: Bill Silvia

FALMOUTH

WCIB

Insight; 6-6:30 am; Sunday
Producers: Kathy Bowmar and Susan Nadler; 548-3102

FRAMINGHAM

WVBF/WKOX

The Metro West Journal; 6-9am; Mon-Fri.
Producer: Jean Farbanks; (508) 820-2424; Host: Scott Gibvons

WBUR

Fresh Air; 4-4:30 pm; Mon.-Fri;
Producer: WHYY in Philadelphia; 353-4747; Host: Terry Gross

GARDNER

WGAW

Let's Talk; 9-9:30 am; Mon.-Fri.
Producer: Colleen Page; 874-5610

GREAT BARRINGTON

WSBS

Talk Show; 9-9:30 am; Mon.-Fri.
Producer: Joan Rodgers; 528-0860

HAVERHILL

Open Mike; 6:30-8pm; Mon.-Fri.
Producer: Bill Pike; 374-4733

HOLYOKE

WREB

The Ron Chimelis Show; 1-4pm; Mon.-Fri.
Producer: Ron Chimelis; (413) 536-2934; Host: Ron Chimelis

The Jonathan Evans Show; 6-9am; Mon.-Fri.
Producer: Jonathan Evans; (413) 523-2934; Host: Jonathan Evans

The Barbra Heisler Show; 9-noon; 4-7pm; Mon.-Fri.
Producer: Barbra Heisler; (413) 536-2934; Host: Barbra Heisler

LAWRENCE

WCCM

Hotline; noon-2; Mon.-Fri.
Producer: John Moran; 685-9494; Host: John Moran

LOWELL

WLLH

Morning Magazine; 6-9am; Mon.-Fri.
Producer: Kurt Sinborn; (508) 458-8486; Host: Kurt Ericson

MARLBOROUGH

WSRO

Express Your Opinion; 11:40am-12:30; Mon.-Fri.
Producer: Jerry Russel; 485-1470

MEDFORD

WXKS

In Touch; 6:30-7am; Sunday
Producer: Bill Rossi; 395-3200

NANTUCKET

WXJY

Jam Sessions; 7-9pm; Sunday
Producer: Vicky Goss; 428-4422

NEW BEDFORD

WBSM

The Charlie Verde Show; 5-9am; Mon.-Sat.
Producer: Dave DeRosier; (508) 933-1767

The Stan Lipp Show; 9-noon; Mon.-Sat.
Producer: Dave DeRosier; (508) 933-1767

The Len Roberts Show; 1-3pm; Mon.-Sat.
Producer: Dave DeRoiser; (508) 933-1761

The Dave DeRoiser Show; 3-7pm; Mon.-Sat.
Producer: Dave DeRoiser; (508) 993-1761

The Henry Carreiro Show; 7-11pm; Mon.-Sat.
Producer: Dave DeRosier; (508) 993-1761

WNBH

New Bedford Tonight; 7-10pm; non-sports nights
Producer: Rick Levi; (508) 996-3371; Host: Ed Pereira

NEWTON

WNTN

The Sybil Tonkonogy Show; 7:30-9am; Mon.-Fri.
Producer: Sybil Tonkonogy; 969-1550

NORFOLK

WJCC

The Dick Sinnott Show; 10-noon; Mon.-Fri.
Producer: Dick Sinnott; 384-2553

NORTH ADAMS

WMNB

Opinion; 8:30-9am; Mon.-Fri.
Producer: Paul Hopkins; 663-6567

NORTHAMPTON

WHMP

Forward Northampton; 6:15-6:30pm; Mondays
Producer: Ralph Levy; 580-9233(end)

ORANGE

WCAT

Opinion; 10-11am; Tuesdays
Producer: Richard Partridge; 544-2321

PITTSFIELD

WUPE/WUHN

Sunday Press Conference; 8-8:30am; Sunday
Producer: Tom Higgins; (413) 499-1531; Host Dana Jones

WBEC

The Sally Jesse Raphael Show; 7-10pm; Mon.-Fri.
(413) 499-3333

The Tom Synder Show; 10pm-1am; Mon.-Fri.
(413) 499-3333

WBRK

The Berkshire Connection; 12:30-1pm; Friday
Producer: Toni Carnevale; (413) 442-1553

QUINCY

WJDA

Partyline; 10:30-11:30; Mon.-Fri
Producer: Roy Lind; 479-1300 Contact between 8:30-10:30
Host: Roy Lind

SALEM

WESX

The Party Line; 10:30-11am; Mon.-Sat.
Producer/Host: Bob Hogan; 744-1230

WMWM

Public Affairs, 11-Midnight; Sunday
3:00pm-6:00pm; Monday
Producer: Grace DiaFlor 745-9401

SOUTHBRIDGE

WESO

Roundtable; 8-8:30am; Sunday
Producer/Host: Russ Dowd; 764-4381

SPRINGFIELD

WACE

In The Public Interest; 7:15-7:30am; Saturday
Producer: Don Edwards; 781-2240

WMAS

Senior Highlights; 7:05-7:30am; Saturday
Producer: Ruth McBrain; 787-6486

Today's Perspective; 7:30-8 am; Sunday
Producer: Ron Russell; 781-6397

WSPR

The Dan York Show; 6-10am; Mon.-Fri.
Producer: Bill Brady; 732-4182(end)

TAUNTON

WPEP

Pep Talk; 10:30-noon; Mon.-Frid.
Producer/Host: Lauren Cardoza 822-1570

The Laurel McGregor Show; 2:30-4pm; Mon.-Fri.
Producer: Laurel McGreagor; 822-1570

PROVIDENCE

WSNE

Focus; 7-8am; Sunday
Producer: Dyana Koelsch; (401) 751-5700

WEST YARMOUTH

WOCB

The Forum; 9-12pm; Mon.-Sat.
Producer/Host: Lee Burdoff: 775-0929

WORCESTER

WAAF

Live Wire: 7:00am-8:00pm; Sunday
Producer/Host: Steve LeVelle 752-5611

WFTQ

The First Amendment; 7-8pm; Sunday
Producer: Steve LeVelle 752-4504

WSRS

Speak Out; 6:30-7am; Sunday
Producer: Patty Geier; 757-6321

APPENDIX G

LIST OF NEWSPAPER OFFICES IN MAJOR METROPOLITAN AREAS OF NEW ENGLAND*

Connecticut

Hartford

The Hartford Courant
285 Broad Street
Hartford, CT 06115
(203) 241-6200

New Haven

New Haven Register
40 Sargent Drive
New Haven, CT 06511
(203) 562-1121

Maine

Bangor

Bangor Daily News
491 Main Street
Bangor, ME 04401
(207) 942-4881

Portland

Portland Press Herald
P.O. Box 1460
Portland, ME 04104
(207) 775-5811

* Partial list from Burrelle's New England Media Directory 1988, or write to: Burrelle's Media Directories, 75 East Northfield Road, Livingston, NJ, 07039. Phone Number (201) 992-6600.

Massachusetts

Boston

The Boston Globe
135 Morrisey Boulevard
Boston, MA 02107
(617) 929-2000

The Boston Herald
1 Herald Square
Boston, MA 02106
(617) 426-3000

The Christian Science Monitor
1 Norway Street
Boston, MA 02115
(617) 450-2000

Springfield

Union-News/Sunday Republican
1860 Main Street
Springfield, MA 01101
(413) 788-1000

Quincy

Patriot Ledger
400 Crown Colony Drive
Quincy, MA 02169
(617) 786-7000

New Hampshire

Manchester

The Union Leader
P.O. Box 780
Manchester, NH 03105
(603) 668-4321

Rhode Island

Providence

The Evening Bulletin
75 Fountain Street
Providence, RI 02902
(401) 277-7000

Vermont

Burlington

The Burlington Free Press
191 College Street
Burlington, VT 05401-0010
(802) 863-3441

APPENDIX H

EDUCATIONAL PROGRAMS

Poem & Poster Contest
EPA - Region 1
Contact:* Evelyn Sullivan

Adopt-A-School Program
EPA - Headquarters
Contact: Carolyn Scott (203) 382-3305 or
David Grim (203) 382-4588

Clean Air for Kentucky
Kentucky DEP
Contact: Lillie Cox

Junior Ranger Program
National Park Service - Acadia, Maine
Contact: Debbie Wade

Lung Health Modules
American Lung Association
Contact: Heather Gleason

"Earth Day" Events
EPA - Headquarters
Contact: Ann Boren
EPA - Region 1
Contact: Sally Edwards

Coloring Book: "Auntie Pollution"
EPA - Headquarters
Contact: Melissa McCullough

Coloring Book: "Smogbusters"
Southcoast Air Quality Management District
Contact: Joan Bennett

* Unless otherwise noted, please refer to list of contacts, Appendix A for addresses and phone numbers.

APPENDIX I

STRATEGY FOR CONSTRUCTING A MESSAGE USING MASS MEDIA

The steps outlined below are suggestions for constructing a strategy and disseminating the message through mass media (from the book: The Interplay of Influence by Kathleen Hall Jamieson and Karlyn Kohrs Campbell (Wadsworth Publishing Company, 1988), pages 231 - 233).

Step 1: Isolating the message
Distill the essential message to be communicated from the ocean of information, and draw together essential support material (forceful, dramatic evidence in support of your claim or position).

Step 2: Defining the intended audience
What the audience is expected to do with the information often determines target audience. Reach all the essential people but only the essential people with the message. (Prepare to answer the questions "Why is this on my desk and not on the desk of the assignment editor?" "Why is this on my desk when I don't write about this subject?") Determine if the message will pass through more than one pair of hands if it accomplishes its objective.

Step 3: Determining the newsworthiness of the message
Consider whether you will have to pay to disseminate this message, and whether it can be communicated as soft news if it will not be used as hard news. Decide if it can be made newsworthy by piggybacking off other news, holding it for a slow news day or for dead news time, releasing it in a newsworthy setting, or releasing it through a newsworthy person.

Step 4: Determining factors constraining release
Factors that may affect release of a news item include a congressional deadline, a public promise by a supervisor, someone wanting to see it buried, or someone wanting to see it released and heavily publicized.

Step 5: Selecting appropriate channels
In deciding the channels through which to release information, consider which channels best reach the target audience. Does your media list contain all relevant outlets (all publications reaching target

audiences, all specialized publications that cover this subject, all outlets in a particular locality)? Have all possible channels been considered (press releases to county papers, radio feeds to rural America for use in pre-drive time)? Is the form of the message compatible with the selected channels? Different channels may require different forms. Is the language of the message compatible with the channel--popular language to popular channels, technical language to specialized channels?

If the message is transmitted by phone or given in response to phoned inquiries, the information should be stored in a manner that lends itself to quick, clear retrieval. Responses to inquiries by phone or stories that must be transmitted by phone to meet deadlines should be written down.

Is the message to be released to selected outlets or mass-released? Decide if you should use the elite media such as the New York Times to draw the attention of the other media, and if you should use one medium (such as radio) to sensitize others (for example, print and television) to your message.

Determine whether your message is part of a larger message.

Step 6: Adapting the message to the channel

Each channel imposes constraints on the messages it relays: format ("MacNeil/Lehrer NewsHour," ...or New York Times); deadlines (morning or evening papers, drive-time radio); content (weeklies or dailies...); and cost (costs in equipment and personnel to carry this message).

These constraints influence message construction. Television news is a visual medium (consider the talking head versus the visual aid; the effects of location), and it is an audio-visual medium (the brilliant statement might be mumbled, stumbled, and fumbled). Television news deals in 2- to 2.5-minute units, so try to write the quotable quote, the single synthetic sentence that digests the debate. It is also a medium favoring the dramatic, the confrontational; it often includes upbeat human interest stories at the end of a program. Also, what is not news today may be recast as news tomorrow (newsworthiness is a function of what else is newsworthy that day).

Step 7: Monitoring your success or failure

In reviewing the success or failure of your dissemination effort, ask again what was covered and why? Future messages should be adjusted accordingly. (Jamieson and Campbell, 1988.)

DISCLAIMER

The information contained in this paper is based on personal and telephone interviews, research and publications available to the author. The opinions and assertions contained in the paper are the author's and not to be construed as official or reflecting the views of the U.S. EPA.